

PAIN

Persistent pain is common 1 year after ankle and wrist fracture surgery: a register-based questionnaire study

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Abstract

Background: Substantial literature documents that persistent postsurgical pain is a possible outcome of many common surgical procedures. As fracture-related surgery implies a risk of developing neuropathic pain and complex regional pain syndrome (CRPS), further studies investigating the prevalence and pain characteristics are required.

Methods: All patients undergoing primary surgery because of ankle or wrist fracture at Hvidovre and Odense University Hospitals, Denmark, between April 15, 2013 and April 15, 2014, were identified from the Danish Fracture Database. A questionnaire regarding pain characteristics was sent to patients 1 yr after primary surgery.

Results: Replies were received from 328 patients, of whom 18.9% experienced persistent postsurgical pain defined as pain daily or constantly at a level that interfered much or very much with daily activities, 42.8% reported symptoms suggestive of neuropathic pain, and 4.0% fulfilled the diagnostic patient-reported research criteria for CRPS.

Conclusions: Persistent postsurgical pain 1 yr after wrist and ankle fracture surgery is frequent, and a large proportion of patients experience symptoms suggestive of neuropathic pain and CRPS. Patients should be informed about the substantial risk of developing persistent postsurgical pain. Future studies investigating risk factors for persistent postsurgical pain that include both surgically and conservatively treated fractures are required.

Key words: chronic pain; orthopaedics; pain; postoperative

Substantial literature documents that persistent postsurgical pain (PPSP) is a possible outcome of many common surgical procedures, with incidence rates varying from 5 to 85% dependent on the type of surgery.¹ The aetiology behind the development of PPSP is not fully understood, but numerous risk factors have been identified, including pre- and postoperative pain, intraoperative nerve damage, co-morbidities, age, type of anaesthesia, and genetic and psychosocial factors.^{2–5}

Wrist and ankle fractures are among the most common surgically treated fractures in adults.⁶ Despite the high frequency, data on PPSP after orthopaedic surgery are scarce.^{7–13} As fracture-related surgery implies a risk of developing neuropathic pain and complex regional pain syndrome (CRPS), further studies investigating the prevalence and risk factors of this type of surgery are required.^{12 13}

The use of personal identity numbers in Denmark enables the linkage of register data from the Danish Fracture Database with

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Editor's key points

- Persistent pain after fracture, including complex regional pain syndrome (CRPS), can be a major problem.
- Patients from a national database were assessed for persistent pain 1 yr after injury.
- Of the 328 (54.7%) patients who responded, 62 (18.9%) had clinically significant pain.
- Further work is needed to understand persistent pain after fracture, to minimize long-term problems.

questionnaire data and thus a long-term follow-up of a large number of patients who have undergone surgery for wrist or ankle fracture.⁶

The aim of the present study was to investigate the prevalence, characteristics, and risk factors of PPSP 1 yr after wrist or ankle fracture surgery. We hypothesized that 10% of all patients experienced PPSP 1 yr after surgery, and that a considerable number of these patients would report symptoms suggestive of neuropathic pain and CRPS.

Methods

Patients

All patients were recruited from the Danish Fracture Database (see description below). The inclusion criteria were primary surgery because of ankle or wrist fracture at Hvidovre and Odense University Hospitals, Denmark, between April 15, 2013 and April 15, 2014, and age ≥ 18 yr. Patients meeting these criteria were sent a postal questionnaire with an invitation letter and a stamped envelope for reply between June 1, 2014 and March 1, 2015. Thus, the time of follow-up was 1 yr (range, 46–58 weeks). In order to reduce response bias, patients were urged to respond regardless of whether they had experienced pain or not. Questionnaires that were returned later than after 1 month were not included in data analysis. The study was approved by the Danish Data Protection Agency (2007-58-0015; HVH-2014-019:02768) and the Committee of the Danish Fracture Database. Studies based on questionnaires or registers do not require the approval of the regional or national Committee on Health Research Ethics in Denmark.

Questionnaire data

A questionnaire in Danish was developed for the study and included questions about pain located to the operated ankle or wrist within the last month. The frequency of pain was described as 'constant', 'daily', 'with daily intervals', or 'no pain'. Patients with pain (i.e. all patients except those who answered 'no pain') were also asked about pain intensity and pain characteristics.

Pain intensity (average and worst) was described using a numerical rating scale (NRS) ranging from 0 to 10, with 0=no pain and 10=worst possible pain; and the impact of pain on daily activities was described as 'very much', 'much', 'some', 'little', or 'no'.

Pain characteristics were described using the interview version of the Douleur Neuropathique 4 Questions (DN4), including the following seven items: burning, painful cold, electric shocks, tingling, pins and needles, numbness, and itching. A score of one is given to each positive item and a score of zero to each negative item, and the total score is calculated as the sum. The cut-off value for the tentative diagnosis of neuropathic pain is a total score of three out of the seven items.¹⁴ In addition, patients were asked whether they experienced decreased sensitivity to

touch, pinprick (hypoesthesia), or pain caused or increased by brushing (allodynia) the scar area.

In order to detect possible symptoms of CRPS, the questionnaire also included questions about skin colour changes, temperature asymmetry, swelling, and restricted movement of the operated ankle/wrist. In order to maximize specificity, a tentative diagnosis of CRPS was made according to the Budapest research criteria, which include the above-mentioned features.¹⁵ Patients who reported pain with an average pain intensity more than three on the NRS over the past month and who indicated that they experienced temperature asymmetry, skin colour changes, or both were contacted by telephone or e-mail (whichever was preferred by the patient) and asked more thoroughly about symptom appearance. The patients were also asked whether they had received a medical diagnosis of CRPS.

Pain catastrophizing, quality of life, consumption of analgesics because of pain located to the operated wrist/ankle, reoperation rate, and pain problems elsewhere were assessed in all patients regardless of pain status. Pain catastrophizing was assessed by means of the 13-item Pain Catastrophizing Scale (PCS), which measures thoughts and feelings when experiencing pain.¹⁶ Elements of the PCS include scores of magnification, rumination, and helplessness. Together, these elements provide an overall score of catastrophizing (each item on a scale from 0 to 4, with a maximal score of 52). Quality of life was assessed by the European Quality of Life Questionnaire (EQ5D). It is a widely used instrument for measuring self-rated health on a visual analog scale (VAS, 0–100) and five dimensions describing mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.¹⁷

The primary outcome was PPSP, which we defined as pain experienced daily or constantly within the last month at a level that interfered much or very much with daily activities, based on the two questions related to the frequency and impact of pain on daily life.

Danish Fracture Database

Baseline patient and surgery-related data were collected from the Danish Fracture Database, which was established in 2011 as an online database for registration of all fracture-related surgery.⁶ The data are entered into the database by the surgeon immediately after the surgery and include patient-related, trauma-related, and surgery-related factors. All fractures are classified according to the Orthopaedic Trauma Association/Arbeitsgemeinschaft für Osteosynthesefragen (OTA/AO) classification.¹⁸ Nineteen hospitals across Denmark, covering ~90% of the population, currently participate in Danish Fracture Database collaboration, with ~30 000 registered procedures. Data extracted from the database included age, sex, ASA score, fracture diagnosis (OTA/AO classification), Gustillo type (open vs closed), type of operation (open reduction and internal fixation vs external fixation), use of tourniquet (yes or no), perioperative complications (yes or no), and educational level of the surgeon and supervisor, if available. The follow-up data were obtained using the patient questionnaire.

Data analysis and handling

In order to find a 10% prevalence of chronic pain for each fracture with a 95% confidence level and a 5% margin of error, the estimated sample size (n) needed was: $1.96^2 \times 0.1(1-0.1)/0.05^2 = 138$ patients for each fracture. During the inclusion period, a total of 717 patients (including those who did not fulfil the inclusion

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